

## II.—BERAUNITE—FROM DANDARAGAN, WESTERN AUSTRALIA.

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The occurrence of phosphate minerals at Dandaragan was first officially reported by W. D. Campbell in 1906 (1). They comprised the iron phosphates Dufrenite and Vivianite and the aluminium phosphate Wavellite, besides beds rich in coprolites and apatitised wood.

In 1932 the late Dr. E. S. Simpson visited the area and collected specimens of a new mineral, a hydrous basic phosphate of potassium and aluminium, which was named Minyulite, after Minyulo Well near which it was found (2).

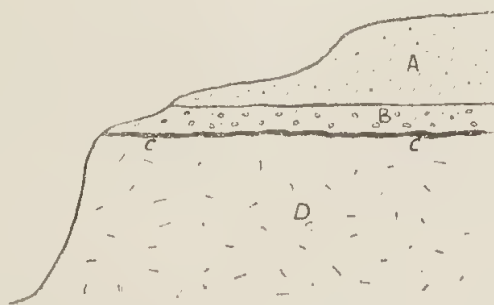
The subject of the present paper, Beraunite, a hydrous ferric phosphate with the formula  $2\text{Fe}_3(\text{OH})_3(\text{PO}_4)_2 \cdot 5\text{H}_2\text{O}$  was collected by Mr. F. Forman from a locality known as "The Caves," about  $2\frac{1}{2}$  miles N.E. of Yandan Hill, during a recent inspection of this area.

The township of Dandaragan lies 22 miles by road west of Moora, which is 106 miles north of Perth on the Midland Railway.

For the following description of the mode of occurrence of the Dandaragan Beraunite the author is indebted to Mr. Forman, Government Geologist.

The mineral is exposed on the face of a bluff about 50–60 ft. high, composed in the lower 30–40 ft. of ferruginous sandstone overlaid by coprolite bearing sandstone 3–5 ft. thick which is in turn capped by what is probably greensand (glauconite bearing sand).

The ferruginous sandstone is impregnated to a depth of from 2–3 ft. below the coprolite bed with dark green dufrenite while the beraunite is confined to a narrow zone, not more than 3 inches in width in the upper surface immediately underlying the coprolite beds. See section.



A. Probable Greensand B. Coprolite  
C. C. Beraunite D. Ferruginous Sandstone

The mineral occurs as radiating fibres with a silky lustre enclosed between walls of lustrous black limonite in irregular veins varying in width from 2 to 5 mm.

The colour in mass varies from Ridgways 13'k, Russet to 21''m, dark olive. Hardness, 4–5. Specific gravity, 2.95.

Under the microscope the fibres are transparent, with opaque blotches due to adhering limonite, which has penetrated between the finest fibres.

Extinction is difficult to ascertain owing to the sheaf-like form and extreme fineness of the fibres, but appears to be straight or of small amount. N in all directions is greater than that of methylene iodide (1.74), and birefringence moderate.

Pleochroism is strong from honey yellow to deep amber.

The material is readily soluble in acids and is decomposed by 5 % NaOH solution, in the latter case about 90 % of the  $P_2O_5$  is soluble.

An analysis of the crushed material separated by floating in methylene iodide Sp. gr. 3.005, and sinking in bromoform Sp. gr. 2.85, then air dried and dried to constant weight over  $H_2SO_4$  and barium perchlorate gave the following results :—

		Mols.	Mol. ratio.
Insol. in HCl	$\left\{ \begin{array}{l} SiO_2 \quad 1.88 \\ \text{Not } SiO_2 \quad .03 \end{array} \right.$		
Sol. in HCl	$\left\{ \begin{array}{l} Al_2O_3 \quad .43 \\ Fe_2O_3 \quad 54.11 \\ MnO \quad Nil \\ CaO \quad Nil \\ MgO \quad Nil \\ Na_2O \quad .58 \\ K_2O \quad .12 \\ P_2O_5 \quad 27.24 \\ H_2O + \quad 15.60 \\ SO_3 \quad Nil \\ Cl \quad Nil \end{array} \right.$	<p>338<sup>8</sup></p> <p>191<sup>9</sup></p> <p>865<sup>9</sup></p>	<p>3.4</p> <p>2</p> <p>8.6</p>
		<hr/> 99.99 <hr/>	

The excess mols. of  $Fe_2O_3$  and  $H_2O$  over the ratio 3 : 2 : 8 may be accounted for by intergrown limonite which it was impossible to eliminate.

#### SUMMARY.

A physical and chemical description is given of the mineral beraunite, a hydrous phosphate not previously reported from this State.

(1) *Geol. Surv. W.A. Bull.* 26, pp. 14-23.

(2) *Jour. Roy. Soc. W.A.*, 1932, XIX, pp. 13-16.